



# Backyard Graywater System

Written By: Tim Drew



## TOOLS:

- [Drill \(1\)](#)
- [Hacksaw \(1\)](#)
- [Shovels \(1\)](#)
- [Tinsnips \(1\)](#)
- [Torpedo level \(1\)](#)
- [Wheelbarrow \(1\)](#)



## PARTS:

- [ABS pipe \(1\)](#)  
*[long enough to run from the washing machine down underground and to irrigation outlets](#)*
- [ABS primer \(1\)](#)
- [Glue \(1\)](#)
- [ABS fittings \(1\)](#)  
*[to connect pipe; I used 90° elbows, 16° elbows, and straight junctions.](#)*
- [ABS fittings \(1\)](#)  
*[I used only one. You might need to get these from a professional plumbing supplier; all other materials should be found at a local hardware store.](#)*
- [Plastic pot \(1\)](#)  
*[1 for each split and irrigation outlet. I used 3.](#)*
- [Stepping stones \(1\)](#)  
*[or pavers](#)*
- [Bark mulch \(1\)](#)  
*[\\$1-\\$4 per cubic foot](#)*

## SUMMARY

The typical American household sends the water it's bathed, brushed its teeth, and cleaned its clothes with, called graywater, to the municipal waste facility. Then it waters its lawns and gardens with more fresh water, wasting about 1,000 gallons per month. But you can safely use graywater for irrigation if it's handled by a proper recycling system, and if you use biodegradable detergent and don't wash diapers.

As an avid gardener living in dry California, I wanted a simple and inexpensive way to reuse water to keep my garden green and healthy. In 2004, my wife and I had to retrofit our house's basement, so I moved the laundry machines to the back carport, which is at a slightly higher elevation than our adjacent garden and far from a sewer connection. This was my opportunity. At first, I simply let waste water from the washer run into a 3" flexible corrugated pipe, which I moved around to drain near any plants that I wanted to water. Later, after we decided not to move the machines back inside, I built this more permanent underground system.

## Step 1 — Install the standpipe and underground drain pipe.



- My design uses a 2" ABS standpipe that runs down from the washer and connects to a gently sloping horizontal pipe buried under a garden path. At the other end, the water splits and travels a bit farther in 2 directions, then flows out through perforated pots and bark chip mulch, and into the soil beneath some water-loving plants and trees. The area to be watered was 40' away and 10' below the washer.
- First I excavated the path that the underground pipe would follow, making sure that it was deep enough to allow for a downward slope of at least 1/4" per foot. I installed the standpipe behind the washer using pipe straps, and joined it to the underground pipe (as with all joints) using ABS primer and glue. Later, I buried the joint in gravel.

## Step 2 — Split the line with a double-ell fitting.



- At the other end of the long underground pipe, I installed a double-ell fitting to split the water into 2 streams feeding different locations. To make sure the water split evenly, I held a torpedo level against the fitting to ensure it stayed level while I glued it up. To keep the fitting easily inspectable and accessible for repairs rather than buried in dirt, I enclosed it in a plastic pot .

## Step 3 — Install the outlet pots.



- I dug trenches for more 2" pipe to run from the split to the 2 outlets where the water enters the soil. At each, I used a perforated 5gal black plastic pot to distribute the water. I used tinsnips to cut a hole high up on the side of each pot for the pipe to enter, and drilled 1/2" to 1" perforations in the bottom and around the sides for the water to flow out. You can also nest a perforated 5gal pot below a 10gal pot used as a retaining wall.
- I buried the pots in trenches dug 3'-4' long and 1'-2' deep, filled the trenches back up with medium chip bark mulch, and covered each pot with a paving stone. For more height, you can also cover with a trimmed inverted pot. The mulch helps distribute the water to the plant roots while maintaining good drainage around the outlets.



## Step 4 — Bury the pipes.




- Finally, I buried the pipes, covering the main pipe run with paving stones and redwood bark mulch to turn it back into a path. I also put a paver over the split point, to allow for easy access later.
- TIPS: It's important to keep an open space around all the pipe terminals, to let you periodically remove any solids, so they don't build up and block the flow. Similarly, it's important to have an open space around the double-ell, so the split can be inspected. Other systems I've seen have a large hole bored into the top of the double-ell to let you visually inspect the interior of the fitting for clogs and clear it out with a finger if needed.



## Step 5 — Graywater Systems: A Gray Legal Area



- **CAUTION:** Graywater systems are legal in California and other states, but depending on your location, you might be legally limited to certain types of systems and required to get a permit. 
- Obtaining a permit can be a roll of the dice, and many people don't bother because of the expense, hassle, and uncertainty. This creates a Catch-22 situation: local building inspectors are overly cautious and scrupulous because they have little familiarity with graywater recycling, so nobody builds permitted systems and the inspectors stay in the dark. The more graywater systems people build with permits, the more experience building inspectors will have with them, and the easier it will be to build them and get inspectors to sign off on them.

My garden loves the system, which cost less than \$150 in materials, and I've already installed pipe and outlets for another one that will reuse the rest of our house's graywater. Our household of 5 adults does about 6 or 7 loads of laundry per week. At roughly 40 gallons per, that's 260 gallons saved. And it's energy saved as well; around 20% of the energy used in California is related to water use — pumping, treating, disposing, etc.

As far as I know, the type of system I built was originally described (although perhaps not

designed) by Art Ludwig of Santa Barbara, Calif. He calls this type of system a "branched drain to mini-leach field system" and describes it in detail in his book *Create an Oasis with Greywater*, which is available at [oasisdesign.net](http://oasisdesign.net).

**NOTE: This project first appeared in MAKE Volume 13, page 151. <http://makezine.com/13>**

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